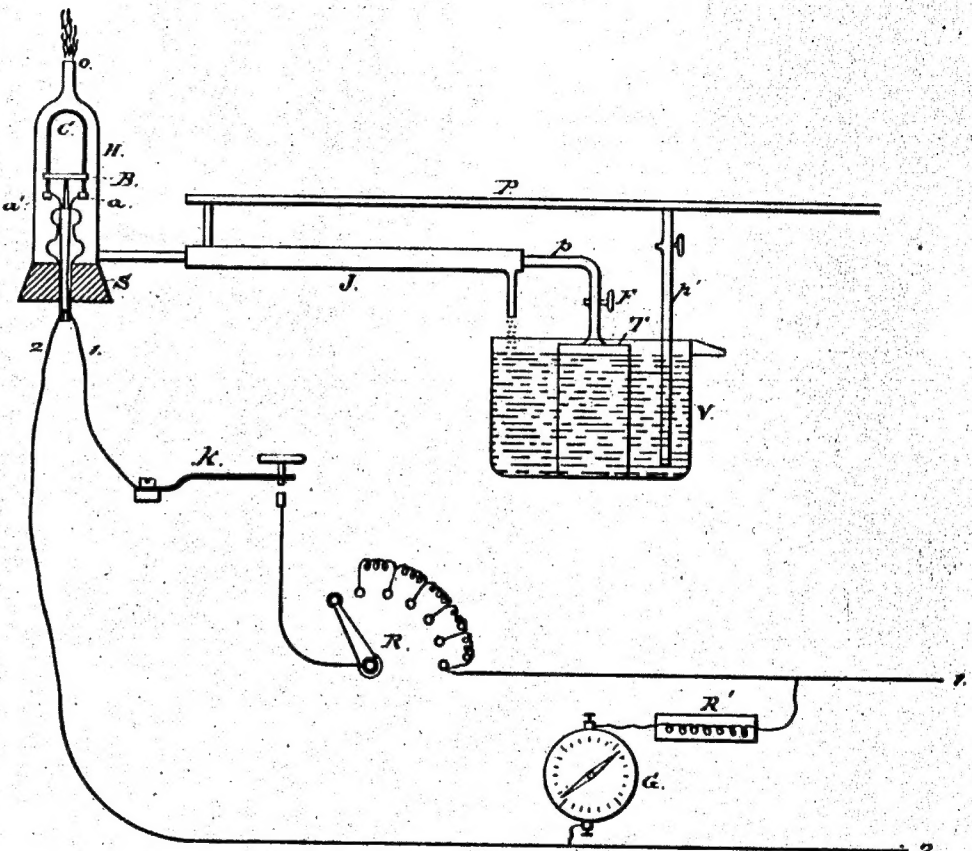


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Method of Forming Enlarged Ends on Carbon Filaments.

Patented March 22, 1881.



Inventor =

Thos. A. Edison

For
Dever & Miller

Clitell.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY.

METHOD OF FORMING ENLARGED ENDS ON CARBON FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 239,151, dated March 22, 1881.

Application filed November 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Method of Forming Enlarged Ends on Carbon Filaments; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

As hitherto explained in various applications for patents by me made and now on file, very desirable carbons for incandescent electric lamps may be made of various vegetable fibrous substances. As the body or illuminating portion of such carbons is exceedingly small—a mere filament or thread-like body—it is necessary that they be provided with ends greatly enlarged, in order to afford a good electrical contact with the clamps in which they are secured. With some materials, such as paper, wood, bamboo, &c., it is possible to make these enlarged ends integral with and a part of the carbon itself, by suitably shaping the material prior to carbonization. Other fibers, however—such, for instance, as “monkey-bast”—are simple filaments, and the enlarged ends have to be built upon them. In prior applications I have disclosed several methods of accomplishing this.

The object of this invention is to furnish another method and means for making the necessary enlarged ends, and to that end it consists in the features more particularly hereinafter described and claimed.

In carrying the invention into effect, a carbon is so attached to electrical conductors that a current shall be passed only through the portion or portions which it is desired to enlarge. It is then placed in a glass globe or receiver having a small opening in its top. Connected with the globe are means for generating and passing into the globe a stream of hydrocarbon vapor capable of decomposition under high heat. In the electrical circuit are placed resistances, by which is regulated the pressure of the current passing through the carbon. A shunt is arranged with a galvanometer and resistances, so that the amount of current passing through the carbon may be regulated. The vapor is allowed to pass

through the globe until all the air therein is displaced, the excess of vapor being burned at the opening in the top of the globe. The circuit being closed, the portions of the carbon through which it passes are heated thereby to incandescence, decomposing the vapor contiguous thereto, with the result that the carbon therefrom is deposited upon the heated portion of the conductor. The process is kept up until the portions referred to are sufficiently enlarged.

In the drawing is shown an arrangement of means well calculated to carry into effect the invention, although the invention is not limited to the employment of the precise means therein illustrated.

H is the glass globe or holder, having aperture *o* in its top, while the bottom thereof is sealed by the stopple *S*, through which passes the support of the carbon *C*. The carbon *C* is secured in temporary clamps *B a a'*, of which *a* is connected to conductor 1, and *a'* to conductor 2, of a circuit of any suitable source of electricity, while the clamp *B* connects both limbs of the carbon, so that the circuit is via 1 *a B a'* 2. The distance between *B*, *a*, and *a'* is equal to the portion of the carbon which it is desired to enlarge.

V is a water-reservoir, in which is a tank, *T*, for containing a carbon compound capable of vaporization under moderate heat. From it a pipe, *p*, leads to and communicates with *H*.

P is a steam-pipe having a branch, *p'*, leading into *V*, and another leading into the jacket *J* around *p*. Steam being admitted thereto heats the water in *V*, causing the vaporization of the compound in *T*, while the steam in jacket *J* heats *p* to a degree preventing condensation therein.

It is an adjustable resistance placed in one branch of the circuit, so that the electro-motive force or pressure of the current passing from *a* to *B*, and from *B* to *a'*, may be regulated.

G is a galvanometer, and *R'* an adjustable resistance in a derived circuit to 1 2, forming a shunt to the carbon, so that the amount of current passing thereto may be indicated and regulated.

The parts being in position, the vapor from *T* passes through *H*, the surplus burning at *o*

and preventing access of air to the interior; the circuit is closed at K, whereupon the carbon between *a* and B and *a'* and B is heated, decomposing the vapor and causing a deposition of carbon upon the heated portions. This deposition is symmetrical and uniform, and is allowed to proceed until the portions are sufficiently built up to afford good clamping-surfaces.

10 Instead of a separate tank for the carbon compound, a small reservoir may be made, directly attached to and communicating with the globe or receiver H, and a piece of solid carbon compound, such as solid naphthaline, placed in such small attached reservoir. Heat being applied thereto, carbon vapor passes into the globe and over and around the carbon under treatment, with the same result as in the other construction.

20 I do not claim herein, broadly, the deposition of carbon by electrical incandescence from a carbon compound, as such was practiced in early years by Buff and Hoff, and others; but

What I do claim is—

1. The method herein described of forming 25 enlarged ends upon carbon conductors, consisting in forming an electrical circuit only through the portion desired to be enlarged, thereby heating the same in a vessel through which flows a stream of vapor from a carbon 30 compound, substantially as set forth.

2. The combination of a receiving globe or chamber, means for passing therethrough a stream of vapor from a carbon compound, and means for forming an electrical circuit through 35 any desired portion or portions of a carbon conductor within said globe or chamber, substantially as set forth.

This specification signed and witnessed this 19th day of November, 1880.

THOS. A. EDISON.

Witnesses:

WM. CARMAN,

ERNEST J. BERGGREN.